



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/563,124

01/03/2006

Koji Abe

MAM-071

1181

20374 7590 08/18/2009

KUBOVCIK & KUBOVCIK
SUITE 1105
1215 SOUTH CLARK STREET
ARLINGTON, VA 22202

EXAMINER

HAN, KWANG S

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

08/18/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/563,124	Applicant(s) ABE ET AL.	
	Examiner Kwang Han	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 June 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 11-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 11-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

NONAQUEOUS ELECTROLYTE SECONDARY BATTERY

Examiner: K. Han SN: 10/563,124 Art Unit: 1795 August 18, 2009

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 5, 2009 has been entered.
2. Claim 1 was amended. Claims 12-15 were added.
3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.
5. Claims 1-9 and 11 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed,

had possession of the claimed invention. The newly added limitations of "with respect to a total amount of the metal elements other than lithium" as recited in the newly amended claim 1 does not have support within the specification. Applicant points to paragraph 25 and Table 1, which are directed towards the molar ratio and mol percentage of the total compound which does not provide support for the newly added limitations.

For the purposes of examination the mol % will be determined with respect to all the elements in the compound as is commonly accepted and well known in the art.

6. Claims 1, 2, 4, 5, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamamoto et al. (US 6436582) in view of Gao et al. (US 6277521).

Regarding claims 1 and 2, Hamamoto et al. is directed towards a nonaqueous electrolyte lithium secondary battery (1:9-13) comprised of the following:

- a negative electrode containing a graphite material as the negative active material (4:7-16), and
- an electrolyte containing 1 wt % of a sulfonyl-containing compound (2:31-54; 7:7-11).

Hamamoto et al. discloses a cathode material comprised of lithium cobalt oxide (3:63-64) but is silent towards the group IVA and IIA elements.

Gao teaches a lithium secondary battery with a positive electrode comprised of an exemplary intercalation compound $\text{LiNi}_{0.7}\text{Co}_{0.15}\text{Ti}_{0.05}\text{Mg}_{0.05}\text{O}_2$ which has a 1.6 mol % of a Group IVA element (Ti) and 1.6 mol % of a Group IIA element because it provides

Art Unit: 1795

significant improvement in the irreversible capacity and cycleability of the intercalation compound (2:66-3:3; 4:60-5:5). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a intercalation lithium cobalt oxide compound with 1.6 mol % of a Group IVA element and a Group IIA element in the positive active material because Gao teaches it provides a lithium secondary battery with improvement in irreversible capacity and cycleability.

It is noted that newly amended limitations of "wherein said lithium cobalt oxide is obtained by mixing raw materials for preparing a lithium cobalt oxide with raw materials for preparing a lithium cobalt oxide with raw materials of said group IVA element and said group IIA element and heat treating the mixed raw materials" is a product-by-process limitation. "Even though product-by-process are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F. 2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). The lithium cobalt oxide of Gao is similar to that of the Applicant's, Applicant's process of obtaining the lithium cobalt oxide is not given patentable weight in the claims.

Regarding claim 4, Hamamoto et al. discloses a sulfonyl-containing compound that is 1,4 butanediol dimethanesulfonate (2:49-53).

Regarding claim 5, Hamamoto et al. discloses 1,4 butanediol dimethanesulfonate in an amount at 1 wt% (7:7-11).

Regarding claim 7, Hamamoto et al. discloses a nonaqueous electrolyte solution containing diethyl carbonate (3:27-28).

7. Claim 3, 6, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamamoto et al. in view of Gao et al. as applied to claim 1 above, and further in view of Hibara et al. (JP 2002-158035, machine translation).

Regarding claims 3 and 11, the teachings of Hamamoto et al. and Gao et al. as discussed above are herein incorporated. Hamamoto and Cho are silent towards the use of a vinylene carbonate in the electrolyte.

Hibara et al. teaches the use of vinylene carbonate within the electrolyte composition for a nonaqueous electrolyte for a secondary battery [0052] in an amount ranging from 0.05 to 5 wt% [Claim 5] for the benefit of providing an electrolyte that better suppresses reduction decomposition of the electrolyte [0051, Abstract]. It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Hibara's vinylene carbonate in the electrolyte of Hamamoto modified by Gao's battery for the benefit of better suppressing reduction decomposition of the electrolyte.

It has been held that where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990) (MPEP 2144.05)

Regarding claim 6, the teachings of Hamamoto et al. and Gao et al. as discussed above are herein incorporated. Hamamoto et al. and Cho et al. are silent towards the use of a divinyl sulfone in the electrolyte for the secondary battery.

Hibara et al. teaches the use of divinyl sulfone [0048-0050; Claims 5, 8] in a nonaqueous electrolyte for a secondary battery in an amount between 0.05 to 1 wt % for the benefit of providing control for the reduction peak [Abstract]. It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Hibara's divinyl sulfone in Hamamoto modified by Cho's nonaqueous electrolyte for the benefit of providing control for the reduction peak. It has been held that where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990) (MPEP 2144.05)

8. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamamoto et al. in view of Gao et al. as applied to claim 1 above, and further in view of Ogino et al. (US 5153082).

Regarding claims 8 and 9, the teachings of Hamamoto et al. and Gao et al. as discussed above are herein incorporated. Hamamoto et al. and Gao et al. are silent as to a charge capacity ratio at a specified potential.

Ogino et al. teaches a nonaqueous electrolyte secondary battery in which the negative electrode and positive electrode materials are selected to vary the charge capacity [Abstract]. It is further taught that the electrodes thicknesses can be varied to

Art Unit: 1795

adjust the capacity ratio (7:47-59) to improve the charge/discharge and overdischarge properties (8:65-9:4) thereby teaching it as a result effective variable. It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Ogino's charge capacity variations in Hamamoto and Gao's battery for the benefit of improving the charge/discharge and overdischarge properties. The courts have held that optimization of a result effective variable such as the ratio of charge capacity between a positive and negative active material is not novel. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

9. Claims 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamamoto et al. (US 6436582) in view of Gao et al. (US 6277521) and Hibara et al. (JP 2002-158035, machine translation).

Regarding claim 12-14, Hamamoto et al. is directed towards a nonaqueous electrolyte lithium secondary battery (1:9-13) comprised of the following:

- a negative electrode containing a graphite material as the negative active material (4:7-16), and
- an electrolyte containing 1 wt % of a sulfonyl-containing compound (2:31-54; 7:7-11).

Hamamoto et al. discloses a cathode material comprised of lithium cobalt oxide (3:63-64) but is silent towards the group IVA and IIA elements, the electrolyte containing divinyl sulfone and vinylene carbonate.

Gao teaches a lithium secondary battery with a positive electrode comprised of an exemplary intercalation compound $\text{LiNi}_{0.7}\text{Co}_{0.15}\text{Ti}_{0.05}\text{Mg}_{0.05}\text{O}_2$ which has a Group IVA element (Ti) and a Group IIA element because it provides significant improvement in the irreversible capacity and cycleability of the intercalation compound (2:66-3:3; 4:60-5:5). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a intercalation lithium cobalt oxide compound with a Group IVA element and a Group IIA element in the positive active material because Gao teaches it provides a lithium secondary battery with improvement in irreversible capacity and cycleability.

Hibara et al. teaches the use of divinyl sulfone [0048-0050; Claims 5, 8] in a nonaqueous electrolyte for a secondary battery in an amount between 0.05 to 1 wt % for the benefit of providing control for the reduction peak [Abstract]. It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Hibara's divinyl sulfone in Hamamoto modified by Cho's nonaqueous electrolyte for the benefit of providing control for the reduction peak. It has been held that where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990) (MPEP 2144.05)

Hibara further teaches the use of vinylene carbonate within the electrolyte composition for a nonaqueous electrolyte for a secondary battery [0052] in an amount ranging from 0.05 to 5 wt% [Claim 5] for the benefit of providing an electrolyte that better suppresses reduction decomposition of the electrolyte [0051, Abstract]. It would have been obvious to one of ordinary skill in the art at the time of the invention to apply

Art Unit: 1795

Hibara's vinylene carbonate in the electrolyte of Hamamoto modified by Gao's battery for the benefit of better suppressing reduction decomposition of the electrolyte. It has been held that where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990) (MPEP 2144.05)

It is noted that claims 15 is a product-by-process claim. "Even though product-by-process are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F. 2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). The lithium cobalt oxide is similar to that of the Applicant's, Applicant's process of forming lithium cobalt oxide is not given patentable weight in the claims.

Contact/Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kwang Han whose telephone number is (571) 270-5264. The examiner can normally be reached on Monday through Friday 8:00am to 5:00pm.

Art Unit: 1795

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571) 272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. H./
Examiner, Art Unit 1795

/Dah-Wei D. Yuan/
Supervisory Patent Examiner, Art Unit 1795